

WHAT IS CLAIMED IS:

1. A method of manufacturing a thin-film semiconductor device, comprising:

the step of preparing a member having, on a separation layer, a semiconductor film having a semiconductor element and/or semiconductor integrated circuit;

the step of forming kerfs from the semiconductor film side of the member; and

the separation step of, after the kerf formation step, separating a desired region of the semiconductor element and/or semiconductor integrated circuit from the member.

2. The method according to claim 1, wherein the separation step is performed by injecting a fluid into the kerfs.

3. The method according to claim 1, wherein the member is obtained by forming a porous layer on a surface of a semiconductor substrate, forming the semiconductor film on a surface of the porous layer, and then forming the semiconductor element and/or semiconductor integrated circuit.

4. The method according to claim 3, wherein the semiconductor film is formed on the surface of the porous layer after forming a protective film on inner walls of pores in the porous layer.

5. The method according to claim 1; wherein the

- member is obtained by forming the semiconductor element and/or semiconductor integrated circuit on a surface of a semiconductor substrate and implanting ions from the surface side to a predetermined depth to form the separation layer.
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6. The method according to claim 3, wherein the semiconductor substrate is a single-crystal silicon substrate or a compound semiconductor substrate.
7. The method according to claim 5, wherein the semiconductor substrate is a single-crystal silicon substrate or a compound semiconductor substrate.
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8. The method according to claim 1, wherein the kerfs are formed in the semiconductor film.
9. The method according to claim 1, wherein the kerfs are formed in a region formed in a process of forming the semiconductor element and/or semiconductor integrated circuit on the semiconductor film.
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10. The method according to claim 1, wherein the kerfs are formed by one of dicing, etching, laser abrasion, ultrasonic cutter, and high-pressure jet.
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11. The method according to claim 1, wherein the kerfs are formed such that bottom portions thereof are located in the separation layer or at an interface between the semiconductor film and the separation layer.
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12. The method according to claim 1, wherein the member has the separation layer and semiconductor film on a semiconductor region, and the kerfs are formed

- such that bottom portions thereof are located at an interface between the separation layer and the semiconductor region or in the semiconductor region.
13. The method according to claim 2, wherein the
5 separation step is performed by injecting a high-pressure fluid from the kerfs.
14. The method according to claim 2, wherein the separation step is performed by injecting the fluid comprising a liquid or a gas to at least some of the
10 kerfs.
15. The method according to claim 14, wherein the separation step is performed by injecting the fluid from at least two of the kerfs around the desired region.
- 15 16. The method according to claim 1, wherein the separation step is performed under a static pressure.
17. The method according to claim 1, wherein the desired region is formed into a chip by the separation step.
- 20 18. The method according to claim 1, wherein the desired region is formed into a plurality of chips by the separation step.
19. The method according to claim 1, wherein the member is formed again using a remaining member that is
25 left after the desired region is separated from the member.
20. A thin-film semiconductor device obtained by

processing a member having, on a separation layer, a semiconductor film having a semiconductor element and/or semiconductor integrated circuit,

wherein the process comprises

5 the kerf formation step of forming kerfs from the semiconductor film side of the member, and

 the separation step of, after the kerf formation step, separating a desired region of the semiconductor element and/or semiconductor integrated circuit from
10 the member.

21. A method of manufacturing a semiconductor device, comprising:

 preparing a member which has a separation layer on a base and a semiconductor film having a plurality
15 of chip regions on the separation layer;

 forming kerfs in the semiconductor film to partition the plurality of chip regions; and

 forming cracks in the separation layer to separate each of the partitioned chip regions from the
20 base.

22. A semiconductor device obtained by processing a member having a separation layer on a base and a plurality of chip regions on the separation layer,

 wherein the process comprises

25 forming kerfs in the semiconductor film to partition the plurality of chip regions, and

 forming cracks in the separation layer to

- separate each of the partitioned chip regions from the
- base.